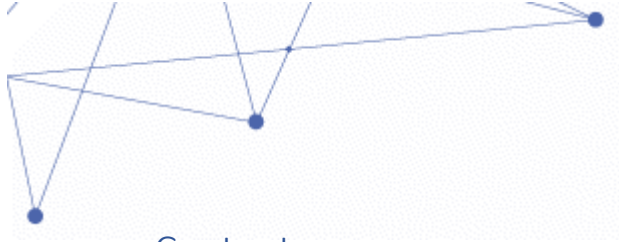


Analysis 2 – Comparative Analysis Enterprises



„Virtual Reality for Education Network" (VReduNet) is a project of the INTERREG VA Austria-Czech Republic program (Interreg ATCZ256).



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Preface

A number of companies were approached in the specified period. The result of this process was a set of twenty interviewed companies, which were further analyzed. The following are the results of this analysis.

About the project

VReduNet - Virtual Reality for Education Network

The project is based on the idea of getting to know each other, establishing relationships and building a functioning network of cross-border cooperating organizations in the entire program area (South Bohemia/Upper Austria), which deals with the current topic of using virtual and augmented reality (hereafter AR/VR) in business practice and education system and developing the necessary skills of current and future employees. supported. At the same time, it is about connecting highly specialized experts in the development of AR/VR programs with organizations in the field of education and connecting them with innovators and, through them, especially with small and medium-sized enterprises in border regions. The target groups of the cross-border network are organizations of the regional innovation infrastructure, pedagogues of schools, universities for teacher education and universities where future experts are being prepared, organizations for further education and professional training, representatives of business practice, especially small and medium-sized enterprises, representatives of public administration (regional development, education, etc.) and others, e.g. research institutions.

As part of the project, analyzes were processed and compared in the affected border regions with the aim of assessing the current state of AR/VR use on the one hand and outlining the expected development of these technologies in the coming years on the other. Based on this information, the requirements for school and business education and vocational training organizations are defined. Subsequently, a test facility for AR/VR will be built in the South Bohemian Science and Technology Park, which will be used cross-border by the participants of the created network and in which the qualification program for teachers and employees developed as part of the project will be developed and tested. The main goal of the project is the cross-border cooperation of the members of the created network, the possibility of exchanging experiences, introducing new AR/VR trends into corporate practice and high-quality training of future experts. With this goal, the project contributes to strengthening the competitiveness of enterprises in the program area and to stability in the entire region.

Previous activities and approach Regional analysis

In the initial phase of the project, emphasis was placed on network development, so a large part of the time was devoted to finding suitable network partners. Many phone calls and meetings with researched contacts followed. Most of them could also be obtained for the network, so the first webinar was organized on June 1, 2021. The speakers were Mr. Klaus Stöttner , CEO of Pool 3, and Mr. Andrej Barguca , co-founder of Virtual Lab , who informed 41 participants about VR training at the webinar "Virtual reality - the future of training". On July 6, an Austrian round table was held under the title " Auf in neue Welten ". Based on various Austrian examples of use, the benefits of VR/AR were discussed together with 35 participants. After the main speeches of Jeremiah Diephuis (FH OÖ Campus Hagenberg) and Florian Hofer (Ars Electronica Center) on VR research perspectives and relevant Ars exhibitions Five application examples were presented to the Electronica Center.

Afterwards, each of the experts supervised a topic table to discuss the example they had brought and answered questions: from low-cost virtual reality in schools to WheelSim VR - e-wheelchair training in virtual reality to "next-generation learning" through 3D animation mixed reality models.

Another approach in the first months was the preparation of a regional analysis. Together with all project partners, analyzes were created and finally the LimeSurvey online survey tool was added . After that, already obtained and suitable partners of the network were approached and asked to fill in the questionnaire. The meeting often included a presentation of the project and filling out a questionnaire. Finding Upper Austrian companies that use VR/AR in their own company was much more difficult. Many of the requested companies did not respond to our project, canceled it or were simply not interested in it. In addition, the impression that many companies do not realize the importance of VR/AR or do not pay attention to it due to time constraints has been reinforced.

Difficulties of regional analysis

We have overcome many difficulties to successfully implement this regional analysis. Several shutdowns and other restrictions caused by the covid pandemic forced us to improvise and change the plan in some areas.

However, thanks to the joint efforts of the project team, we managed to collect and analyze valuable data.



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What industry are the company i from?

Austria	Czechia
Automotive	Automotive
Food business	Furniture and wood production
IT	IT
Mechatronics	Mechatronics
Medical technology	Other
Other	Plastics

Management, employees and the company's openness to digitization

We decided to start our survey with general questions about digitization in the surveyed companies. These answers help us understand companies better

The company's management is aware of the importance of digital transformation

	AT	CZ
Among the company's executives, there are many that we have yet to win over to the idea of digital transformation.	2	11
Company management supports innovation and the process of digitization and automation, but not everyone has the skills to implement a digital strategy in practice.	7	3
Company management is able to implement digital transformation into daily operations.	11	5

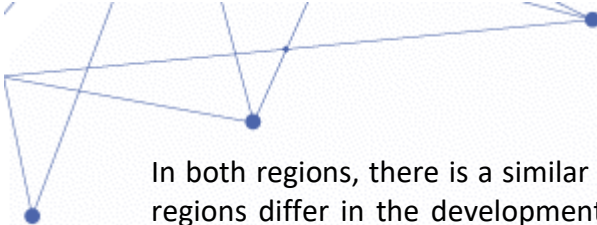
Digital transformation is a basic prerequisite for company growth

	AT	CZ
It is a tactical matter for us, we implement partial projects.	4	6
It is an important topic, we are preparing for digitization, we are carrying out pilot projects.	6	5
Yes, that is our most important strategic task	10	7
About digital transformation we are never they didn't hear		1
About the problem we know in this a moment for us it isn't important		1

The organization already has the necessary digital skills and knowledge to work effectively

	AT	CZ
we are currently preparing an employee development concept, collecting information on the current status and readiness of employees to work in a data environment	2	6
Currently, our employees already have all the necessary digital skills and knowledge to work effectively in the new situation of the digital environment	10	1
We are not yet concerned with the readiness of employees and their potential development in this area; this topic will probably only be relevant when the digital transformation strategy is implemented	4	3
We are currently investing in the education and training of our employees in the use of technology and digitization throughout the organization	4	10





In both regions, there is a similar consensus on the importance of digital transformation. Both regions differ in the development stage of implementation. While Upper Austria has already started the process of digital transformation and companies have learned how to implement these strategies, on the Czech side it is an initial phase when employees are being trained and management is getting attention on this topic. A common problem for the entire region is the lack of qualified workers



Operating model, environment for creating digital value and digital management

Do you have a digital strategy in place?

	AT	CZ
We have developed a digital strategy and are finalizing the integration of systems, processes and data	4	3
We have developed a digital strategy, which we have been concretely implementing for some time	8	3
We have developed a digital strategy and are implementing the first pilot projects according to it	4	4
We are working on a digital strategy	3	8
We have not developed such a strategy	1	5

What (if applicable) is hindering the implementation of a digital strategy in your company?

	AT	CZ
Lack of support from management	1	2
Lack of know-how	1	5
Lack of vision and conceptual approach	2	6
Lack of employees	6	5

Do you expect digitization to radically increase efficiency?

	AT	CZ
Thanks to digitization, there is an exponential increase in efficiency, we have managed to create and dominate new markets that we serve more or less automatically	3	2
We expect some efficiency gains to show up later	9	13
We are increasing efficiency many times, the introduced automation is starting to bear fruit	8	3
We do not expect any major changes		2

Companies in the region are in agreement about the lack of employees and the expectation of increased work efficiency. The difference on the Czech side is the greater number of companies that have not created a digital strategy and lack know-how.



Technology

We asked companies the question "What modern technologies do you use/solve?". And we also wanted to know in which departments.

Austria	IoT	Cyber . Safety	AR/VR	Automation and robotics	Simulation Digital twin	Cloud computing	Big Data	3D printing	RFID/NFC	AI
Production	4	3	2	2	5	7	6	2	2	7
Development	5	5	7	4	6	8	7	3	3	10
Services	4	3	5	1	3	8	4		3	1
Health and safety	1	1	3		1	1	1		1	1
Marketing	1	2	4		2	8	2		2	3
Trade	1	2	4	1	2	4	1		1	
HR	2	4	1	1		5	4			
IT	5	16	4	2		13				

Czechia	IoT	Cyber . Safety	AR/VR	Automation and robotics	Simulation Digital twin	Cloud computing	Big Data	3D printing	RFID/NFC	AI
Production	3	1	1	10	1	1	2	2	4	
Development	4	4	5	3	3	3	1	3		3
Services	3	2	3	3	1	2	2	1	1	1
Health and safety	1		1	1	1					
Marketing	1	1	5	1		3	2			
Trade	1		4	2		1				
HR	1		3	1		1			1	
IT	2	9	4	3		6				

When do you plan to implement AR/VR?

	AT	CZ
Already implemented	8	9
Within a year	1	1
Till five years	5	0
In more than five years	2	0
Implementation is not planned	1	4

What technologies do you use?

	AT	CZ
virtual reality (VR)	8	8
Augmented Reality (AR)	6	6
Mixed Reality (MR/XR)	3	3

How long have you had your VR/AR device? When did you purchase them?

	AT	CZ
Purchased in the last 2 years	3	3
Purchased within the last 6 years	5	4
Purchased more than 6 years ago	1	1

What or who led you to the purchase decision?

Austria	Czechia
Customer requirements	Management
Inner motivation; immersive technology as another added value in the value chain.	Marketing, market
Management/was tested, is excited, was purchased	Enthusiasm for the cause
At that time still a very limited selection; prototype development; Trevisio with VGA resolution	Needs clients
technical criteria	Interest in technology
Travel restrictions due to corona	

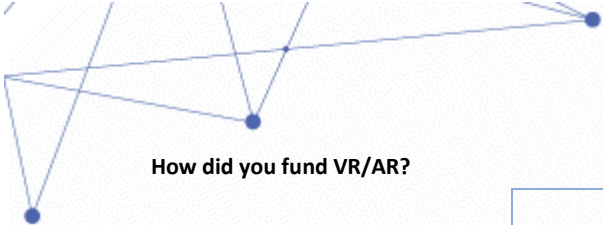
What kind or types of VR/AR headsets do you have?

	AT	CZ
PC with outdoor viewing (HTV Vive, Oculus Rift,...)	7	6
PC with internal tracking (Windows Mixed Reality, HTC Cosmos,...)	5	4
Separate headsets (Oculus Quest)	5	5

What computers do you use for VR? (Laptops/desktops/is the performance sufficient?)

	AT	CZ
Notebook	4	7
Desktop PC	7	6





How did you fund VR/AR?

	AT	CZ
Own resources	7	10
Grants	4	1
Loans	0	1
Gifts	0	0

Who oversees VR/AR implementation for you?

	AT	CZ
Internal expert	7	8
External consultant	3	4

What software are you using?

	AT	CZ
Custom development	7	5
Contract development	3	2
Commercially available	7	5
We are still looking	0	10

In terms of technological equipment, it can be stated that this is a homogeneous region. Both regions have been using the same technology for a similar amount of time. They differ only in the details of the primary purpose of using VR and in the software used. While companies on the Austrian side know suitable software solutions, Czech companies are still looking for suitable products.



Companies without VR experience

Are you planning to implement VR/AR?

	AT	CZ
No	2	7
Yes	5	3

What activities do you plan to use VR/AR for?

	AT	CZ
Production (training process)	0	1
Development (visualization, simulation, testing)	1	2
Service (process training, remote connection)	0	2
In the field of health and safety at work (training on correct and incorrect procedures)	0	0
Marketing (employee benefits, customer communication)	4	1
Business (visualization, virtual meetings, training, services)	2	3
HR (soft skills training)	1	0
Different	2	0

Why don't you plan to use VR/AR?

	AT	CZ
Financial investment	1	2
Insufficient technology	0	2
Complexity of implementation	1	2
No added value	1	5
Insufficient human resources	1	1
Different	0	0

Are you currently registering any demand from employees or customers?

No	5	7
Yes	2	4

Are you considering working with partners on new innovative solutions and products for your or other companies?

No	1	3
Yes	8	7



Value attitudes towards AR/VR

	Austria					Czechia				
	I definitely agree	I rather agree	I rather disagree	I definitely disagree	Not applicable	I definitely agree	I rather agree	I rather disagree	I definitely disagree	Not applicable
AR/VR opens up many new possibilities for the economy.	40%	60%	0%	0%	0%	50%	25%	15%	0%	10%
AR/VR opens up many new possibilities for education.	55%	45%	0%	0%	0%	60%	20%	5%	0%	15%
The use of VR/AR should be taught in schools.	35%	45%	15%	0%	5%	35%	35%	20%	0%	10%
The benefits of AR/VR outweigh the cost/effort.	35%	45%	20%	0%	0%	30%	30%	20%	0%	50%
AR/VR is too controversial for the health of its users.	0%	10%	55%	25%	10%	5%	15%	45%	15%	20%
AR/VR is relatively easy to use.	20%	40%	40%	0%	0%	10%	55%	20%	5%	10%
I have a general interest in VR/AR.	70%	30%	0%	0%	0%	50%	30%	5%	5%	10%
The main purpose of AR/VR is entertainment/gaming.	0%	10%	15%	20%	55%	15%	0%	35%	30%	20%
In the next three years, I will probably be using VR/AR in my work.	40%	15%	35%	5%	5%	30%	20%	15%	15%	20%



Summary

Businesses on both sides of the border understand and feel the need for digital transformation. This fundamental change is implemented at a different pace and is significantly dependent on the number of qualified workers and the demands on the financial side of the matter - purchase of technology, training, etc. In general, the biggest demand that emerged from the answers is a significantly greater degree of cooperation between companies, but also schools. Furthermore, there are very often mentioned workshops, training in the field of virtual and augmented reality. It was therefore appropriate to strengthen this network created at the round tables and in other parts of the project and to work on it in the next program period.

There is a very strong demand for networking between individual companies, as well as schools, in the program area, which needs to be supported from all sides - an example for supporting businesses in the field of technological transformation, which will help ensure both finance and the acquisition of know-how, is the current program 'Digital Europe' focused directly on bringing technology closer to businesses, companies and people. Its aim is to invest in digital infrastructure so that strategic technologies can contribute to strengthening Europe's competitiveness, to the green transition and also to ensuring technological sovereignty.

Enterprises in the program area can be divided into three groups on the basis of AR/VR involvement.

- **Group 1** : Enterprises using technology on a long-term basis over a period of several years. They mainly use AR/VR in new product development and training. These enterprises suffer mainly from a lack of skilled workers. Most often they confirm the need for cooperation between other enterprises, but also schools and universities and active preparation for VR in school education.
- **Group 2** : Enterprises, which do not currently use VR but are planning to acquire the technology. They are mainly motivated by their enthusiasm for the technology, staff training and the implementation of meetings. The driver was the epidemic situation where face-to-face meetings could not take place. Their most common needs are adequate meaningful software and acquiring more know-how through training and collaboration.
- **Group 3** : These are enterprises that do not plan to purchase RA/VR technology at present or in the near future (1-3 years). This is mainly due to the financial and implementation complexity together with the low possibility of meaningful use in their industry.

